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Spanish Research Report for 1988

by

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Subarea 1

Status of the Fisheries

Pair trawl fishery of cod

Cod catches and effort data are presented in Table 1. The derived catch-rate indices are presented in Table 2. The overall fishing effort in 1988 was reduced by a 20% in relation to 1987 due to, among other reasons, to Div. 3M cod fishing moratorium.

By-catches are presented in Table 3. During 1988 there were two observers on board pair trawlers for periods of two months each. Sampling intensity of catch was:

	Div. 3L	Div. 3M	Div. 3N
Samples	14	-	13
Fishes measured	3186	-	3741
Otoliths aged	751	-	476
Cod Catches (t)	17192	-	14823

Estimates of the length and age composition of the catch in month with samples are presented in Tables 4 and 5. Figure 1 shows the age composition of the catch from 1985 to 1988.

Groundfish fishery of freezers

Catch and effort data are presented in table 6. Catch sampling was made on board by four observers during 1988. American plaice length and age composition of the catch estimated in months with samples are presented in table 7 and 8. Length frequencies of witch flounder, yellowtail, silver hake and skates are presented in tables 9 to 12.

Special Research Studies

A fishing survey of Flemish Cap was carried out in July 1989. The survey had a bottom trawl stratified random design and 120 tows were made up to a depth of 720 meters (400 f.). Results of the survey are presented in the report (SCR Doc.) and it includes age composition for cod, American plaice and redfish (S. marinus) stocks.

Table 1. Cod catches (t) and fishing effort (hours) of pair trawlers in 1987.

Month	3L		3N	
	catch	f	catch	f
JAN -	4988	2671	851	731
FEB -	834	2576	323	361
MAR -	1998	2562	837	1127
APR -	471	3046	312	1041
MAY -	771	2410	577	1153
JUN -	1169	1483	1916	1611
JUL -	2521	2564	1646	1733
AUG -	651	1619	1144	1761
SEP -	664	1276	1446	1995
OCT -	659	815	1842	2228
NOV -	1291	434	2740	3223
DEC -	1175	2877	1189	1030
Total	17192	24333	14823	17994

Table 2. Catch rate indices for cod derived from pair trawl catches.

	1982	1983	1984	1985	1986	1987	1988
3L -		1.680	1.052	1.049	1.125	0.831	0.819
3M -		0.789	1.302	1.169	0.796	0.413	
3N -	0.520	0.698	1.053	0.576	0.467	0.510	0.626

Table 3. By-catches of the pair trawl cod fishery (tons).

	Div.:	3L	3NO	total
Haddock		-	11	11
Redfishes		55	27	82
American plaice		265	61	326
Yellowtail flounder		-	-	-
Atlantic halibut		2	3	5
Wolffishes		12	8	20
Skates		283	53	336
Cod catches		17192	14823	32015

Table 4. Length composition of pair trawlers cod catches (x 10E-3).

Div. Month	3L					3N	
	JAN	FEB	MAR	OCT	NOV	OCT	NOV
24-26							9
27-29		1					58
30-32		2			5		91
33-35		6		1	10		89
36-38		4	1		25	6	65
39-41	51	7	1	6	24	3	47
42-44	172	5	1		17		37
45-47	245	4	3	6	12	1	22
48-50	467	6	3	2	7		16
51-53	543	6	16	6	12	2	20
54-56	492	11	43	3	7	5	25
57-59	308	13	39	5	8	2	36
60-62	432	21	74	7	10	2	36
63-65	257	17	62	6	15	5	45
66-68	73	15	63	6	12	1	48
69-71	73	17	70	4	9	5	43
72-74	25	9	52	12	5	6	25
75-77	13	13	51	3	8	7	21
78-80		14	40	7	12	9	14
81-83	25	9	26	11	13	14	13
84-86		9	28	12	10	17	12
87-89		15	12	9	12	21	16
90-92		13	13	6	18	24	13
93-95		9	6	4	9	19	10
96-98		9	2	7	10	14	8
99-101		1	2	1	10	13	8
102-104			2	1	7	14	11
105-107				2	7	10	9
108-110				1	7	11	8
111-113				5	2	5	13
114-116				1	2	9	9
117-119					1	4	8
120+				3	5	14	24
total	3176	236	610	137	311	243	909
fish.meas.	1084	275	783	169	875	225	3516
Catch (t)	4988	834	1998	659	1291	1842	2740

Table 5. Age composition of pair trawlers cod catches (x 10E-3).

Div. Month	3L					3N	
	JAN	FEB	MAR	OCT	NOV	OCT	NOV
age							
2		2			8	1	202
3	22	12	1	11	91	8	179
4	550	16	8	10	21	4	68
5	1401	28	75	17	28	9	117
6	936	48	176	34	42	8	86
7	239	53	217	25	37	32	89
8	25	40	92	31	50	71	60
9	3	31	34	8	28	76	59
10		6	7	1	5	24	32
11					1	7	12
12						3	5
13							
14							
15							
16+							
total	3176	236	610	137	311	243	909
Catch (t)	4988	834	1998	659	1291	1842	2740

Table 6. Catches (t) and fishing effort of freezers in 1988.

Div.:	3L	3M	3NO	total
Cod	237	141	1066	1444
Redfishes	39	146	558	743
American plaice	906	1608	7724	10238
Yellowtail flounder	-	-	3205	3205
Atlantic halibut	-	3	126	129
Witch flounder	101	409	2878	3388
Skates	1258	601	7773	9632
Silver hake	-	-	190	190
White hake	17	17	852	886
Haddock	-	-	465	465
Squid (Illex)	-	-	-	-
Angler	-	-	251	251
hours fishing	4471	7343	43615	55429

Table 7. American plaice length frequency of freezers catch (x 10E-3).

Div.	3L				3M				3NO			
Month	MAY		JUN		FEB		MAR		APR		MAY	
sex	M	F	M	F	M	F	M	F	M	F	M	F
10-11												
12-13												
14-15												
16-17												
18-19	1											
20-21	3	2									1	1
22-23	7	7	1						1		2	
24-25	4	9	5	1					4		15	
26-27	13	14	9	3	2	1			13	1	34	3
28-29	20	20	11	6	3	3			24	5	44	21
30-31	3	20	11	7	2	3	1		12	5	30	27
32-33	4	26	16	16	5	2			22	5	42	12
34-35	4	24	14	13	13	3	1		71	3	79	7
36-37	2	16	12	18	11	2			81	6	71	9
38-39	1	22	7	22	5	4			40	11	32	16
40-41		9	3	21	1	7			23	45	6	26
42-43		6	3	16		3	1		10	84	5	34
44-45		5	1	14		1			2	74		38
46-47			1	13					1	28	1	16
48-49			1	11		1			1	10		10
50-51				8						12		6
52-53				4						10		11
54-55				5						6		4
56-57				1						4		1
58-59				2						1		
60-61												
62-63				1								
64-65												
66-67												
68-69												
70-71												
total	62	180	95	182	42	30	2	2	305	310	362	242
n.samples	2		9		22		8		12		6	
fish.meas.	233		672		1672		449		1071		567	
Catch (t)	89		189		47		2		445		333	

Div. Month sex	JAN		FEB		MAR		3NO APR		MAY		JUN		JUL		AUG		3NO OCT		NOV		DEC	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
10-11																						
12-13																						
14-15																						
16-17																						
18-19																						
20-21																						
22-23																						
24-25																						
26-27																						
28-29																						
30-31																						
32-33																						
34-35																						
36-37																						
38-39																						
40-41																						
42-43																						
44-45																						
46-47																						
48-49																						
50-51																						
52-53																						
54-55																						
56-57																						
58-59																						
60-61																						
62-63																						
64-65																						
66-67																						
68-69																						
70-71																						
total	156	312	328	409	489	786	105	126	219	481	518	999					706	663	718	757	105	125
n.samples	3		6		19		4		2		8						13		12		5	
fish.meas.	185		606		3763		711		404		1664						1546		1793		683	
Catch (t)	288		526		625		101		321		1098						519		439		137	

Table 8. American plaice catch at age frequency ($\times 10E-3$).

Div. Month sex	JAN		FEB		MAR		3NO APR		MAY		JUN	
	M	F	M	F	M	F	M	F	M	F	M	F
age												
2												
3												
4	1		6	12	1	3			6		1	
5	5	4	37	37	30	51	8	6	52	41	16	8
6	17	21	63	66	137	159	24	18	42	69	59	47
7	66	48	109	91	248	262	38	42	55	134	143	11
8	42	53	68	56	68	174	24	34	40	120	171	284
9	10	34	23	21	5	68	8	14	16	53	69	168
10	8	33	14	33		39	2	6	6	24	41	96
11	4	27	5	31		14	1	2	1	17	10	71
12	2	31	5	25		7		3	1	14	5	66
13	1	29		24		7				4	1	18
14		18		6				1		4		16
15		12		5						1		8
16+		2									2	6
total	156	312	328	409	489	786	105	126	219	481	518	999
Catch (t)	288		526		625		101		321		1098	

Div. Month sex	JUL		AUG		3NO OCT		NOV		DEC	
	M	F	M	F	M	F	M	F	M	F
<u>age</u>										
2										
3					23	9	61	57		2
4	28	11	25	9	71	103	92	167	2	9
5	185	105	119	55	222	137	250	198	13	16
6	205	207	77	100	145	103	154	120	20	17
7	334	210	142	113	127	110	102	87	28	21
8	185	387	98	266	63	98	39	61	19	22
9	146	192	67	161	33	52	15	30	13	16
10	18	94	23	74	9	32	2	18	4	13
11		54		67	6	9	2	7	4	4
12	54	54	18	98	4	7	1	7	2	3
13	1	18	1	36	1	3		5		2
14					1					
15		4		9	1					
16+				18						
total	1156	1336	570	966	706	663	718	757	105	125
Catch (t)	1446		1307		519		439		137	

Table 9. Witch flounder length frequency in samples. Division 3NO.

Month	MAR		APR			MAY		JUN		JUL		OCT	
	M	F	i	M	F	M	F	M	F	M	F	M	F
<u>length</u>													
18-19													
20-21			4			1							
22-23			1	1									
24-25			3	1				1					
26-27				3		1		4	4			1	
28-29						2	1	18	19	1		4	
30-31		1		1	1	4	2	39	28	2	3	5	
32-33	1			5	2	5	1	48	55	12	17	4	
34-35	5	2		28	5	8	2	97	87	37	31	6	1
36-37	3	5		51	11	12	6	88	72	76	50	3	3
38-39	7	5		110	15	30	5	99	86	112	67		6
40-41	12	4		131	31	28	8	64	115	134	98	3	7
42-43	7	13		159	85	35	8	58	100	116	121	1	2
44-45	11	7		128	102	17	21	31	101	70	138		4
46-47	5	10		75	139	11	26	8	118	26	113		2
48-49	1	8		51	118	4	30	4	108	14	116		3
50-51		2		15	108	1	29	1	102	4	86		
52-53	1	1		9	87		22		84		58		
54-55		2		1	58		11		44		30		
56-57	1				40		5		12		6		
58-59					9				4		1		
60-61					1		1						
62-63					1								
64-65													
total	54	60	8	769	813	158	179	560	1139	604	935	27	28
n.samples	2			19		4		18		14		2	
fish.meas.	114			1590		337		1698		1539		55	

Table 10. Yellowtail flounder length frequency in samples. Div. 3NO.

Month	JAN		MAR		OCT		NOV		DEC	
<u>length</u>	M	F	M	F	M	F	M	F	M	F
12-13							1		1	1
14-15			3	3			4	5	10	11
16-17			1	4	2		28	33	48	54
18-19	1	3	2	3	3		91	90	106	126
20-21	8	19	11	10	8	6	136	124	116	120
22-23	59	51	14	19	16	8	134	110	139	110
24-25	25	29	13	17	7	19	161	145	203	173
26-27	10	7	12	6	10	17	161	176	143	140
28-29	8	8	10	8	4	4	74	112	52	76
30-31	10	8	14	9	1	1	26	35	30	23
32-33	10	4	9	7	1	2	13	15	9	15
34-35	6	7	9	8			5	9	7	7
36-37	8	3	4	6	1	2	4	7	12	8
38-39	4	4	6	2				2	2	6
40-41	4	3	2	5	1	1	2	4	1	3
42-43	3		1	1				1	1	1
44-45				2				1		2
46-47										
48-49	1			1						
40-51										
52-53										
54-55										
56-57										
58-59		1								
60-61										
62-63		2								
64-65										
total	157	149	111	111	54	60	839	870	880	876
n.samples	8		2		2		18		18	
fish.meas.	306		222		114		1709		1756	

Table 11. Silver hake length frequency in samples. Div. 3NO.

Month	MAY	
<u>length</u>	M	F
25		
26		
27	1	1
28	1	
29	7	
30	27	1
31	28	2
32	17	3
33	7	7
34	1	15
35		19
36		12
37		8
38		7
39		2
40		1
41		
42		
total	88	78
n.samples	1	
fish.meas.	166	

Table 12. Skates length frequency in samples. Div. 3N.

<u>length</u>	<u>APR</u>	<u>length</u>	<u>APR</u>	<u>length</u>	<u>APR</u>
21		51	14	81	2
22		52	18	82	3
23		53	9	83	4
24		54	12	84	2
25		55	8	85	1
26		56	13	86	1
27	1	57	23	87	2
28	1	58	7	88	2
29		59	7	89	
30	1	60	8	90	
31	4	61	8	91	1
32	2	62	6	92	
33	2	63	4	93	
34	4	64	6	94	
35	4	65	9	95	1
36	2	66	9	96	
37	5	67	7	97	
38	5	68	9	98	
39	5	69	1		
40	4	70	6		
41	7	71	8		
42	5	72	4	n.samples	4
43	2	73	9	fish.meas.	368
44	11	74	7		
45	8	75	6		
46	7	76	7		
47	10	77	3		
48	8	78	7		
49	12	79	3		
50	6	80	5		

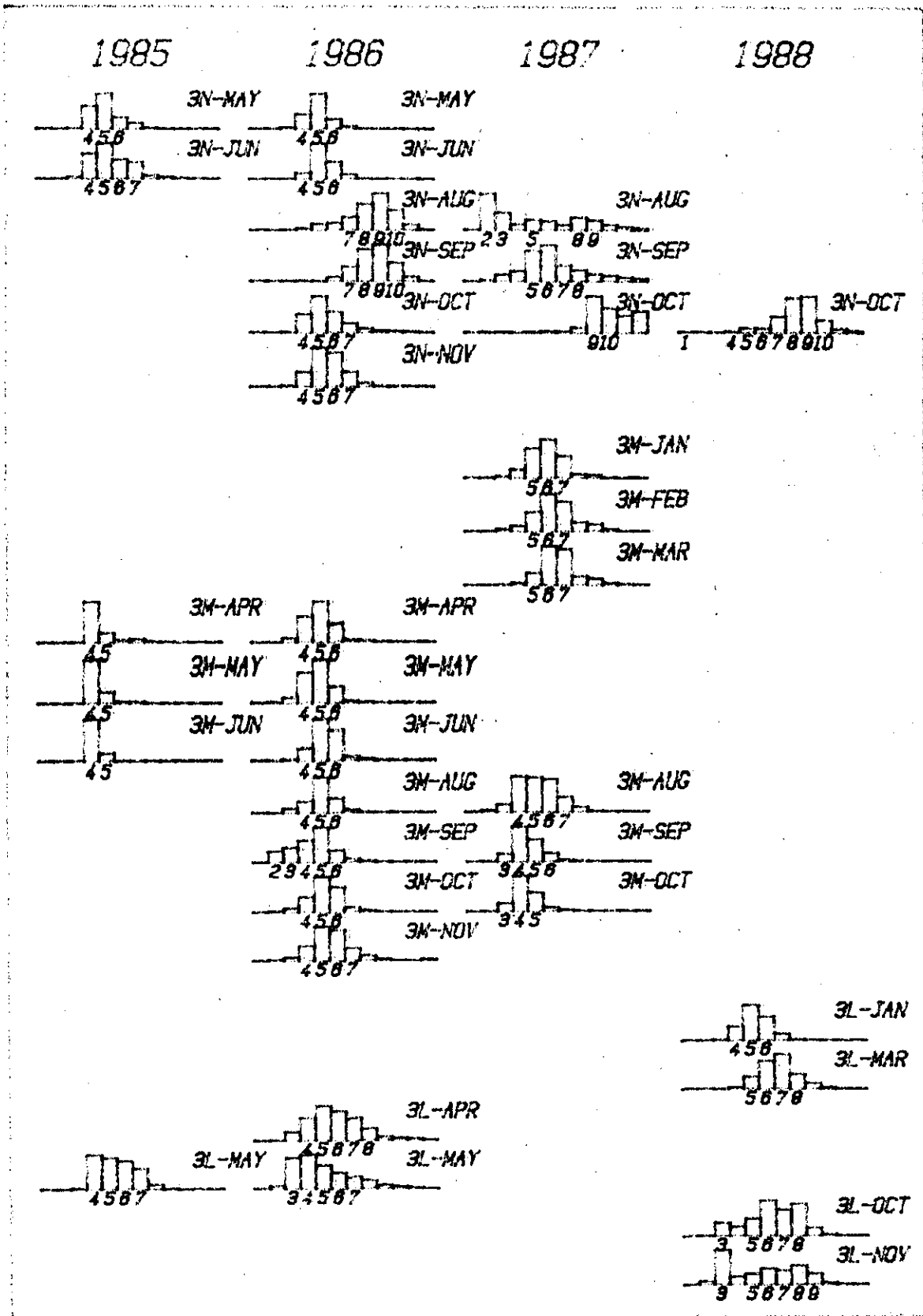


Fig. 1. Age distribution of pair trawl cod catches.